

which, upon the admission of compressed air or other fluid into the channel 6, will be urged rather firmly against the inner wall of sleeve 2 by the pneumatic pressure prevailing in the corresponding spaces 7, with the associated inlay portions 10a in a relatively slackened state, and will further include other cushion sections 9b whose inlay sections 10b are stretched to the limit of their diameter D and which therefore act with less friction but with greater geometric stability upon the contacting sleeve wall.

The thinner wall portions of cushion sections 9b can be produced, in the fully inflated state of body 4, by machining the outer surface of these portions as indicated at 9c in FIG. 1.

Upon release of the fluid pressure in channel 6, body 4 collapses into the spaces 7, with inversion of curvature of its portions 9 and of inlay sections 10a, as has been illustrated dot-dash lines in FIG. 2. The sleeve 2 may then be readily removed from the shaft 1 for inspection, repair, or replacement by another sleeve of similar inner dimensions.

As has been illustrated in FIG. 3, ribs 5' on a shaft 1' may be arranged in pairs to receive between them the non-inflated sections 8' of a clutch body 4' generally similar to body 4 of FIGS. 1 and 2. FIG. 3 also illustrates that the ribs, instead of being annular as in the preceding embodiment, could be helically shaped so as to form part of continuous threadlike ridges, the connecting sections 8' having of course the same helical configuration; in this case, in which the spaces 7' between the rib pairs all communicate with one another when the body 4' is inflated, it will suffice to provide a single radial branch from central feed channel 6' although, if desired, additional branches could also be drilled into the shaft 1'.

In FIG. 3 I have shown the body 4' in its deflated state (full lines), the inflated condition having been indicated by dot-dash lines along with the position of a sleeve 2' held in place by the inflated body. Again, as described above, the cushion sections (here helical) of the clutch body and the large-diameter portions of its insert 10' (also helical) invert their curvature upon a changeover from the inflated to the deflated state or vice versa.

Naturally, the selective thickening of certain cushion sections for increased frictional coupling, described in connection with FIGS. 1 and 2, may also be adopted in the arrangement of FIG. 3.

It will thus be apparent that the substantially non-extensible insert 10 or 10' acts as a stabilizing means which resists deformation of the inflated body 4 or 4' and tends to maintain the engaged sleeve 2 or 2' in precisely coaxial relationship with its carrier shaft 1 or 1'.

The admission of fluid into the channel 6 or 6' and the subsequent venting of this channel may be accomplished with the aid of suitable valves, e.g. as described in my above-identified prior application and patent.

I claim:

1. A pressure roller comprising a shaft connectable to a source of motive power, a cylindrical sleeve removably surrounding said shaft with annular clearance, a

continuous body including a plurality of inflatable cushion sections disposed in said clearance at axially spaced locations for frictionally connecting said shaft with said sleeve, said body further including noninflatable sections between said cushion sections and being positively secured to said shaft by said noninflatable sections for enabling removal of said sleeve from said shaft in a deflated condition of said cushion sections, and conduit means for concurrently inflating said cushion sections by admitting a fluid under pressure into same, said body having imbedded therein a tubular insert of flexible but substantially inextensible material and of longitudinally undulating outline, said shaft being formed with axially spaced ribs engaging said noninflatable sections, said conduit means opening into the spaces between said ribs, said ribs registering with small-diameter portions of said insert imbedded in said noninflatable sections, said spaces registering with large-diameter portions of said insert which are imbedded in said cushion sections and limit the outward bulging of the latter while enabling said cushion sections to drop into said spaces with inversion of curvature of said large-diameter portions upon a release of the pressure of said fluid.

2. A pressure roller as defined in claim 1, further comprising annular clamping means aligned with said ribs and imbedded in said noninflatable sections for holding the latter against said shaft, said clamping means surrounding said insert.

3. A pressure roller as defined in claim 1 wherein certain of said cushion sections are of reduced thickness between said insert and the outer surface of said body, as compared with other of said cushion sections, whereby upon inflation of said body against said sleeve said insert is slacker in said other of said sections than in said certain of said sections.

4. A pressure roller as defined in claim 3 wherein said certain of said sections are disposed at the extremities of said body, said other of said sections being disposed near the center of said body.

5. A pressure roller as defined in claim 3 wherein the diameter of said large-diameter portions of said insert substantially equals the inner diameter of said sleeve reduced by double the thickness of said certain of said cushion sections whereby said body in its inflated state is substantially incapable of further outward deformation in the region of said certain of said sections.

6. A pressure roller as defined in claim 1 wherein said body consists of elastomeric material and said insert is a textile inlay wholly surrounded by said material.

References Cited by the Examiner

UNITED STATES PATENTS

2,849,192	8/1958	Fairchild	242—72
2,876,961	3/1959	Cole et al.	242—72
3,006,277	10/1961	Willard	29—113 XR
3,046,637	7/1962	Kusters et al.	29—113
3,096,949	7/1963	Huffman	29—113 X

BILLY J. WILHITE, *Primary Examiner.*